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Genus *Nitraria* (Fam. Zygophyllaceae)

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In the main herbarium of Museum Hoang Ho Pai Ho all herbarium samples of the genus *Nitraria* are called *N. Schoberi* L., yet the part of them could be separated into another species, basing upon the following reasons:

In the year 1930, I and Father E. LICENT noticed that the bushes of *Nitraria* growing in the garden of H. H. P. H. Museum differ distinctly by their habitus from each other. Then, I started to watch and study them, and afterwards I came to the conclusion that there are two species of the genus *Nitraria*, growing in the Museum garden. The bushes are brought to the Museum garden by Father E. LICENT.

In the botanical literature, the list of which is placed at the end of this article, are shown two species of this plant for the Far East: *Nitraria Schoberi* L. and *N. sphaerocarpa* MAX. It is a pity that the descriptions of these species are too short.

1) Biological particularity of the development of fruits is not shown, therefore, the authors often mix up the real colouring of the fruits in their ripe condition.

2) The authors contradict each other in the descriptions of the colours of the flowers.

3) Morphological description of the petals, stamens and sepals is missing.

I could not exactly define, for a long time, the above mentioned species of *Nitraria* which I watched, yet I succeeded at last, after receiving the herbarium samples of *Nitraria Schoberi* L. from Professor HANDEL-MAZZETTI.

I give below a short description of the two *Nitraria* species, which are done basing upon the fresh plants, growing in the garden of H.H.P.H. Museum.

I count it for my duty to express my gratitude to Prof. HANDEL-MAZZETTI, Father E. LICENT and Mr. B.P. IACHOVLEFF for their help in my work.



Fig. 1. *Nitraria Schoberi* L. raising over the overgrowth of *Nitraria sphaerocarpa* MAX. (Photo taken 29 VI 1936)

1) *Nitraria Schoberi* L.

Russian name : *Salitrianka*.

Natives of Central Asia call this plant "Harmic"¹⁾

Plants coll. by Father E. LICENT :

Kansou Septentrional, Hoeinanp'ou, with buds and flowers. Leaves are of a medium size (5 VI 1918-No. 3836).

Mongolia, Saint-Jacque (Santaohe) = Sancheng Kong (St. Jacques), 1052 m., lower than waterlevel, with ripe eggshaped fruits and long leaves (11 VIII 1919-No. 5527).

Ordos, Tehuantsing, many buds and few flowers (beginning of blossoming). Long leaves (1. VI 1918-No. 3790).

Ordos, Tehuantsing, with buds, flowers and long leaves (2. VI 1918-No. 3794).

Ordos, Tengkeou et Laumaliangtze, with long leaves (26 IX 1922-No. 6986).

Ordos, Oukiaho, 897 m. lower than waterlevel. Young fruits with an eggshaped narrow stretched pointed top. In fresh condition fruits were apparently

¹⁾ This name is given by N.M. PRZEVALSKY (No. 14 of Literature)

red (25 VI 1923-No. 6995).

Plants collected by other collectors :

702 li from Gu-cheng, with buds and flowers. Short leaves. Coll. A. P. VOROBCHUK. (2 VI 1928).

455 li from the boarder of Sing-tzan, were found on the salines. It is half creeping plant, height from 1.5-2 russian yards, with buds and flowers, medium sized leaves. Coll. A.P. VOROBCHUK. (22 VI 1928).

In Museum H.H.P.H. garden in Tientsin, with buds and flowers. Long leaves, fruits "rouges comestibl." Coll. Père GAUDISSART. (18 V 1929).

In Museum H.H.P.H. garden in Tientsin, few buds, flowers, nearly faded flowers and with very young fruits. Fruits richly covered with white hairs. Long leaves., Coll. Pere GAUDISSART. (27 V 1932)

In Museum H.H.P.H. garden in Tientsin, with buds, flowers, faded flowers and very young hairy fruits. Long leaves. Coll. I.V. KOZLOFF (25 V 1936).

The informations about *N. Schoberi* L. from the literature :

No. 2. Am Ufer des Kaspischen Meeres bei Airakli 22 Mai, bei Gurjeu. Juni (flor.) 12 September (fruct.), in der Aralsteppe Barssuki, Kirghisich : Kis-Kunmas, (Ssyssow) in Herbst 1840 (fruct.); im Lehmsalzboden der Steppe an den mugosarischen Bergen 9, Juni, im Salzthon am Irgis 16 Juni, im Salzmoor an der Nordküste des Aralsees 30 Juni 1841 (flor. et fructificans).

No. 6. Shensi or Kansuh : Tsunglin range (PIASEZKI EX MAX.).

No. 7. Mongolie : plaines salées de l'Ourato (no. 2797) Juil. 1866.

No. 8. Harmut Vogana, October 17, 1899, HEDIN Flowers white. Fruit red or black¹⁾.

No. 9. June I st., 1893, New-chwang, Mukden province (BULLOCK).

No. 10. Taku, saline day flats (COWDRY, No. 11597, June 20, 1920); Hsuan Hua Fu (COWDRY, No. H. 1565, June 26, 1921); shrub, leaves deciduous, fascicled, spatulate and entire; flowers small, yellow; Arn. Arb. det.

No. 13. Gobi, No. 655 6 IX 1927 swollen solontshaks in the valley of the riv. Tuin-gol. Grows on salines on river valleys, on sand hills and on sandy steppes, in the south of the province.

¹⁾ According to the colouring of flowers and fruits one can tell that it is not *N. Schoberi* L.

Russian explorer, N.M. PRZEWALSKY indicates many places in Central Asia, where *N. Schoberi* L. could be found. (Literature no. 17).

Nitraria Schoberi L. could be found growing in three places on flower beds in Museum H.H.P.H. garden. On one of the flower beds *Nitraria* grows in the center, separately as a big bush. The shape of this bush is almost circular shape 120 cm height, and 125 cm. width and has three stalks, the diameter of which is 4.6 and 7 cm.

The bark on the stalks has vertical cracks, expanded in oval or irregular oval. The colour of the bark is smoky-black.

Branches of this bush are curved in the shape of an arches, and their ends

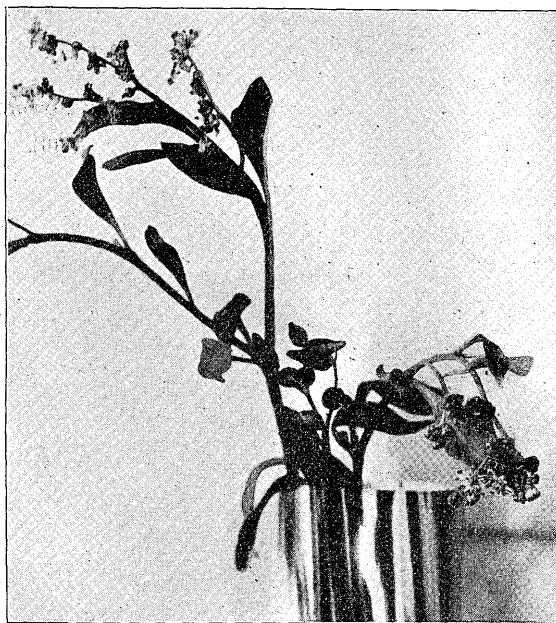


Fig. 2. Inflorescence with buds and flowers, also with unripe fruits of *Nitraria Schoberi*. (Photo taken 16 VI 1936)

are bending very low towards the ground. They start to bend nearly from the very basement of the stalks.

On the two other flower beds this species grows amid the overgrowth of another species, and differs distinctly in its appearance, as it is clearly seen on the photo.

N. Schoberi L. has vertical branches, while the other species half arched. Upon this photo is also seen the difference of size between the leaves. The *N. Schoberi* L. has big

leaves, placed in turn, sometimes singly and sometimes in bundles.

The leaves are lanceolate, broad lanceolate, shovel shaped, not fragile. All leaves have narrowly stretched, cuneate basements which transit into petiole. The leaf-top is rounded, with a thorn or inwardly curved. Most of the leaves

are entire and only occasionally with big crenations. The length of leaves is from 6–54 mm and with 1.75–18.5 mm. The petiole is 0.25–7.5 mm.

The flowers are green, opened starlike. The height of flowers reaches from 2.5 to 4 mm and diameter 5–6.5 mm. The calyx is green either hairy or glabrous, with 5, rarely 6, or 4 short dentate sepals. The corolla usually consists of 5 petals, 4 or 6 petaled corolla is seldom met with, and it is green coloured and glabrate. The petals are cupshaped, with deep inward curve, the edges of the petals are bent in, the tops are with blunt strap, green, glabrate. The flower usually has 15 stamens and rarely 12, then the flower part consists of 4 sepals and 4 petals.

The ripe fruits are barrelshaped or eggshaped and the top has three or four tubercules. There is no thorn on the top of it. The ripe fruit is of dark-red colour and its length reaches from 7.5 to 11 mm., the diameter is from 6.5 to 9.75 mm and it weighs from 0.25 to 0.735 grms.

The seed or stone of the fruit is hard, egg shaped with slightly stretched top and rounded base. The lower part of the stone has deep, rounded hollows, while the top part has three vertical grooves which come narrow at the top, become broad and rounded toward the base.

N. Schoberi L. grows on : Solontshaks S. Russia E. Siberia, Mongolia, Turkestan, Balgistan, S. Mandshuria, Gobi, N. China (Kansou and Ordos) and in S. and E. Australia.

2) *Nitraria sphaerocarpa* MAX.

As diagnosis of *N. sphaerocarpa* MAX. in literature no. 12 is so incomplete, I can't be very sure, that herbarium samples given below belong to this species.

Two above mentioned species were collected by a Russian explorer N. M. PRZEVALSKY in Central Asia, therefore I suspect that the third, new species does not exist. Basing upon statement all samples given below could be referred to *N. sphaerocarpa* Max.

Plants coll. by Father E. LICENT :

Kansou Septentional, Hoeinanp'ou, with in ripe fruits, that have eggshaped narrow stretched pointed top. Leaves set of a medium size (6 VI 1918–No. 3844).

Kansou Septentrional, Weitcheon, more buds than flowers (apparently the beginning of blossoming). short leaves (7 VI 1918).

Kansou Septentrional, Lonschon, with not yet ripened fruits, which have egg-shaped narrow stretched pointed top. Leaves are short and of medium size (9 VI 1918-No. 3882).

Kansou Septentrional, Kan-yen-teh'e. Salé, with buds and flowers. Leaves are very short (23 VI 1918-No. 4000).

Kansou Septentrional, Ta-la-teh'e, with flowers, fading flowers, and very young green fruits. Leaves are of medium size (24 VI 1918-No. 4004).

Kansou Nord, Yen-ho-pou, 1366 m below water level; steppe; with buds, flowers and unripe green fruits. Leaves are short (23 VI 1919-No. 5427).

Mongolia. Tsjiren-chotok (puits), 1120 m below waterlevel. More buds, than flowers (begining of blossoming). Leaves are short (5 VI 1927-No. 7321).

Mongolia, Saint-Jacques (Santaofo), 1052 m below water level, Jardin, with black eggshaped fruit having a thorn on its top. Short leaves (12 VII 1919-No. 5543).

Mongolia, Bord de l. Arguli Noor, with black egg shaped fruit, with a thorn on the top. Leaves are very short and narrow (26 VIII 1917-No. 3391).

Ordos, Borobalgassoun, 1425 m below water level. Bemparts dela vieille cite, Fouè, with buds. Leaves are very short (28 V 1918-No. 3758).

Ordos, Ou-kia-ho, 897 m below water-level, with buds. Leaves are short (25 VI 1923-No. 6994).

Chansi Meridional, excursion à Kou-toei, Talus entre ville fleuve, with buds and flowers. Leaves are short (24 V 1916-No. 1980).

Below are collections gathered by other collectors :

1905 li from border of Sin-tzian, growing on sand hills, half creeping bush, with flowers. Bushes are often seen growing in groups. Leaves are of medium size. Coll. A.P. VOROBCHUK (12 VII 1928).

In Museum H.H.P.H. garden in Tientsin. Fruit noir, non comestible. Few buds with flowers, fading flowers and very young fruits. Leaves are short, Coll. Pere GAUDISSART (27 V 1932).

Chihli, Taku, on the sea shore, Solitriæ gregariae, with young leaves, Coll. I.V. KOZLOFF (4 V 1930).

Surroundings of Tanku, near rivermouth of Hei Ho, *Copiosae gregariae*, with a few buds, fading flowers and ripe, black, eggshaped fruits. Leaves are short. Coll. I. V. KOZLOFF (31 VII 1930).

In Museum H.H.P.H. garden in Tientsin, with buds and flowers. Leaves are of medium size, coll. I. V. Kozloff (25 V 1936).

The informations from the literature:

No. 12. Hab. in Mongolia australi: deserto Gobi ad austrum oppidi; Hami in argilla durissima (PRZEWALSKI, 1879 frf.).

The described plant is a bush with the stalks archly bent, with many branches. Stalks are placed very closely to each other, and are layed upon the furcation of their own lower branches, therefore they form a mass and the bush itself looks like a small hill.

The diameter of stalks reaches 4 cm and the height of the bush 120 cm.

The bark of old stalks is dark grey, covered by vertical cracks, which sometimes are ovaly expanded. Inside the cracks are greenish.

Branches are grey and light grey with green vertical broken lines on some places. Sometimes the branches end with thorns.

Leaves are placed in turns, and sometimes they form bundles consisting of 3 or 4 leaves. Leaves have very short



Fig. 3. Inflorescence with buds and flowers, also with unripe fruits of *Nitraria sphaerocarpa* MAX. (Photo taken 16 VI 1936)

petioles. Form of the leaves lanceolate. Very seldom leaves are of a 2-lobed form. Tops of the leaves are round, yet sometimes they are with a thorn too.

In the basement the tops are cuneiform, fleshy, green, fragile, glabrate, or seldom hairy. Length is 4.5-35.5 mm; width 1.-18.75 mm. The length of petiole is 0.15-1.5 mm.

Flowers are white, and opened in wheel-shape. Height of flowers is 3.75-4.5 mm and their diameter 8.-9.25 mm.

Calyx is short, green fleshy, hairy or glabrate with five(seldom four) sepals. Sepals are of triangular form with a pointed top and are curved outward.

Corolla is white, glabrate with five petals and only exaexceptionally four petals. Petals are shoe-shaped, deeply curved outwards, with inwardly bent edges, bluntly keel-shaped or bent in the shape of a French letter "S". The top is in the form of a hat inwardly curved and with a sharp visor, base is as if cut.

Flowers with five petals have 15 stamens, flowers with four petals 10 stamens.

Ripe fruits are black, with slight blueish shade, or black with a slight violet shade. Their shape is barrel or egg-like or more seldom circular; the basement and the top are inwardly curved; calyx is placed at the basement closely attached to the fruit. The inwardly curved top has a thorn, the length of which is not more than the depth of the curve.

The length of the ripe fruit is 7-11.25 mm, diameter is 4.5-11. mm and its weight is 0.101-0.77 g.

The seed (stone) is hard, egg or barrel shaped, pear shaped, or circular; or egg like flattened shape. The top of a seed is pointed or blunt, the base round. The upper half of the seed is of a trilateral form, corners of the sides blunt, the sides with two vertical cracks, divided by the thin partition. Lower half of the seed is round, with round base and is covered with small hollows.

In the described species, the characteristic feature is the changing of the colouring of fruits in the different periods of their development. Fruits are at first green and very hairy, then the hairs are gradually disappearing. In the last period of their development, the red colour starts to appear at the side exposed to the sun, and the hairs could be seen only on some of them. Then, fruits are turning red all around staying in this period of development for quite a long time, and then at last, they ripen completely—when they are ripe—their colour turns black.

N. sphaerocarpa MAX. grows in the Gobi desert, Mongolia and N. China [Kansou, Ordos, Chansi, Chihli (Taku and Tanku)].

This species is endemic for E. Asia.

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